

Serial No.: 09/458,533  
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## APPENDIX OF PENDING CLAIMS

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We claim:

36. An apparatus for electrical detection of molecular interactions between an immobilized oligonucleotide probe and a target nucleic acid molecule, said apparatus comprising a supporting substrate comprising:

- a) a plurality of micro electrodes each comprising a conjugated polymer film and a different immobilized oligonucleotide probe;
- b) a voltage source connected to said micro electrodes;
- c) an electrolyte solution comprising a solution of  $\text{Li}^+$  ions; and
- d) a detector connected to said micro electrodes.

37. An apparatus for electrical detection of molecular interactions between an immobilized oligonucleotide probe and a target nucleic acid molecule, said apparatus comprising a supporting substrate comprising:

- a) a plurality of micro electrodes each comprising a polymer gel pad and a different immobilized oligonucleotide probe;
- b) a voltage source connected to said micro electrodes;
- c) an electrolyte solution comprising a solution of  $\text{Li}^+$  ions; and
- d) a detector connected to said micro electrodes.

38. An apparatus according to claim 36 or 37 wherein said apparatus further comprises a counter-electrode.

39. An apparatus according to claim 36 or 37 wherein said apparatus further comprises a reference electrode.

40. An apparatus according to claim 36 or 37 wherein said detector will detect changes in impedance at each microelectrode.

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41. An apparatus according to claim 36 or 37 wherein said solution of  $\text{Li}^+$  ions comprises a solution of  $\text{LiClO}_4$ .
42. An apparatus according to claim 41 wherein said solution of  $\text{LiClO}_4$  is about 0.1 M.
43. An apparatus according to Claims 36 or 37 wherein the micro electrodes comprise a conductive material and an insulating material.
44. An apparatus according to Claim 43 wherein the conductive material is solid or porous gold, silver, platinum, titanium, copper, metal oxide, metal nitride, metal carbide, or graphite carbon.
45. An apparatus according to Claim 44 wherein the conductive material is platinum.
46. An apparatus according to Claim 44 wherein the conductive material is gold.
47. An apparatus according to Claim 43 wherein the insulating material is glass, silicon, plastic, rubber, fabric, ceramic or a combination thereof.
48. An apparatus according to Claim 47 wherein the insulating material is silicon.
49. An apparatus according to Claim 47 wherein the insulating material is glass.
50. An apparatus according to Claim 43 wherein the conductive material is embedded in the substrate and the substrate comprises the insulating material.
51. An apparatus according to Claim 43 wherein the conductive material is silver/silver chloride.
52. An apparatus of Claims 36 or 37 wherein the supporting substrate comprises ceramic, glass, silicon, fabric or plastic.

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53. An apparatus of Claim 36 wherein the conjugated polymer or copolymer used for probe attachment includes, but is not limited to, polypyrrole, polythiophene, polyaniline, polyfuran, polypyridine, polycarbazole, polyphenylene, poly(phenylvinylene), polyfluorene, polyindole, their derivatives, their copolymers and their combinations thereof.

54. An apparatus of Claims 36 or 37 wherein probes are attached to micro electrodes using a neutral pyrrole matrix.

55. An apparatus of Claim 37 wherein the gel polymer pads are polyacrylamide.